(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 439 774 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90124429.3**

(51) Int. Cl.5: **A47B 88/10**, F25D 25/02

(22) Date of filing: **17.12.90**

(30) Priority: **24.01.90 IT 8551190**

(43) Date of publication of application:
07.08.91 Bulletin 91/32

(84) Designated Contracting States:
AT BE CH DE ES FR GB IT LI NL SE

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(54) Sliding support structure for drawers, particularly for industrial refrigerators.

(57) A sliding support structure for drawers, includes on each side of a drawer, a fixed supporting profiled element (1) which can be anchored inside a refrigeration compartment (1") and in which a guiding profiled element (2) slides; the guiding profiled element can be anchored to the drawer, and at least one linear roller bearing (3) is interposed between the profiled elements. The linear roller bearing is formed by a substantially rigid and non-deformable cage (4) provided with a stop device which acts on the supporting profiled element; the stop device is in locking position when the drawer is completely extracted and is automatically released when the drawer is at least partially inserted. The stop device is constituted by an element (14) which can oscillate elastically in a substantially vertical direction, is arranged at an end of the cage which is directed toward the outside of the refrigeration compartment, and has engagement members (16, 17) suitable for interacting positively and frontally with a front end surface of the fixed supporting profiled element.

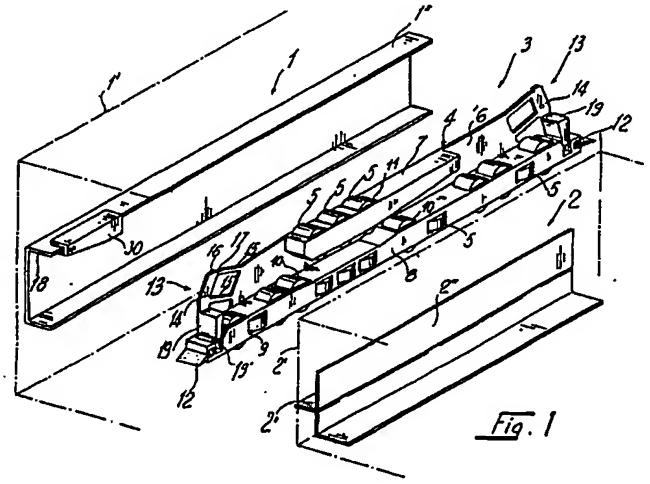

Fig. 1

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SLIDING SUPPORT STRUCTURE FOR DRAWERS, PARTICULARLY FOR INDUSTRIAL REFRIGERATORS

The present invention relates to a sliding support structure for drawers, particularly but not exclusively for industrial refrigerators and the like.

Structures for slidingly supporting drawers of the above type are known and comprise, on each side of a drawer, a fixed supporting profiled element which can be anchored to a refrigeration compartment and in which a guiding profiled element slides; said guiding profiled element can be anchored to the drawer, and at least one linear roller bearing is inserted between said profiled elements.

Like all sliding structures for drawers, those for industrial refrigerators must also be such as to allow the free sliding of the drawer inside the compartment in the easiest and smoothest possible manner. This fundamental requirement must be harmonized with two particular aspects of this specific field of application, namely the considerable weight of drawers for industrial use, which is such as to require sliding and supporting structures which are very rigid and structurally resistant, and the low operating temperatures, which are close to, or lower than, -30 °C (243 °K) and obviously make any form of lubrication inadequate.

Due to the first of these aspects, current supporting and sliding mechanisms are predominantly manufactured using metallic materials such as stainless steel or aluminum alloys. Sliding is obtained by means of rollers or balls which are generally made of nitrided and chrome steel in order to withstand the high operating loads. However, these materials are not sufficiently resistant to the corrosion phenomena which occur at the low temperatures of industrial refrigerators, and in the long run they have the disadvantage of oxidizing and not ensuring the necessary easy sliding of the supports.

Sliding supports which are used exclusively in the field of furniture for civilian use, such as kitchens, desks or wardrobes made of wood or equivalent material, are known. Sliding supports for this use are generally entirely made of plastic and have rollers made of the same material. In some of these known supports, the roller cage can have a stop device which acts on the guiding profiled element which is anchored to the piece of furniture when the drawer is fully extracted and is released when the drawer is at least partially inserted, so as to facilitate the operation of inserting the drawer into the piece of furniture.

UK patent no. 2 101 880 in the name of Julius Bloom GmbH discloses a sliding support for drawers of the above described type, in which the body of the support is made of elastically deformable plastic material and has, at the end directed toward the inside of the compartment, a lower protrusion which is suitable for penetrating in a corresponding cavity defined in the supporting profiled element which is anchored to the piece of furniture when the drawer is extracted completely from the compartment. Thus, in order to release the roller cage it is necessary to insert the guiding profiled element rigidly associated with the drawer up to the innermost end of the cage, so that an abutment element arranged at the innermost end of said guiding profiled element levers on the cage, causing its upward deformation and the disengagement of the stop tooth from the corresponding cavity.

Other examples of sliding and elastically flexible supports are provided by the French patent application, publication No. 2 311 514, and by the UK patent no. 2 017 483. In the latter, the rollers can revolve on hubs which are pivoted on the cage, and one of them is movable along a vertical slot so that it is always in contact with the lower wing of the supporting profiled element. Upon the insertion of the drawer, the guide which is rigidly associated with said drawer interferes with the cage, forcing it to perform a slight tilting motion so as to disengage a cage locking tab from a corresponding hole defined in the supporting profiled element.

In all these known examples, the roller cage is shaped so as to have considerable flexibility in a longitudinal direction so as to allow the engagement and disengagement of the stop elements. This considerable flexibility is undesirable in the sliding supports of drawers of industrial refrigerators which are the subject of the present invention, since, as mentioned above, said drawers require supports which have high rigidity and structural resistance in order to withstand the considerable loads involved.

Furthermore, the flexibility of known devices of the prior art is often the cause of considerable functional disadvantages which occur upon the insertion of the drawer in the refrigeration compartment. In said known sliding supports, the stop devices are in fact released after the drawer has been inserted for approximately the entire length of the roller cage, whereas ahead of this position the insertion of the drawer occurs with considerable resistance due to the friction of the guides on the rollers.

But the most severe disadvantage consists in the fact that the lower end of the guiding profiled element can accidentally collide against the internal walls of the cage before the front end of the profiled element has reached the bottom of the cage and before the drawer has rested on the

sliding support in a substantially horizontal position. This fact causes the unwanted advancement of the cage and forces the operator to perform a series of tedious and complicated manoeuvres in order to extract the drawer completely, return the cage toward the outside of the compartment and retry to insert the drawer with the same likelihood of success. All this occurs with the additional disadvantage of operating at very low temperatures while the compartment of the refrigerator is kept open.

A further disadvantage of said known devices consists in the fact that the supporting profiled elements which accommodate the linear bearings must have cavities or similar local deformations which must be defined on the standard profiled elements, with a consequent burden in terms of manufacturing times and production costs.

The aim of the present invention is to eliminate the disadvantages described above by providing a sliding support structure for drawers of industrial refrigerators which is very strong and reliable though it ensures optimum sliding conditions at low operating temperatures in the course of time.

Within the scope of the above described aim, a particular object of the present invention is to provide a sliding support structure for drawers which has a particularly simplified structure which can be obtained with large-series manufacturing processes at extremely low costs.

Another object of the present invention is to provide a structure which is extremely effective and reliable and can minimize the risk of unwanted and untimely disengagement of the stop devices upon insertion in the refrigeration compartment.

A further object of the present invention is to provide a sliding support for drawers which allows to use supporting and guiding profiled elements which can be associated with the cabinet and with the drawer without altering their standard configuration, so as to be extremely advantageous both from the economical point of view and from the point of view of installation and maintenance.

This aim, these objects and others which will become apparent hereinafter are achieved by a sliding support structure for drawers, particularly for industrial refrigerators and the like, of the above described type, according to the characterizing part of the accompanying claim 1.

Further characteristics and advantages of the invention will become apparent from the description of some preferred but not exclusive embodiments of the structure of sliding support for drawers according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Fig. 1 is a partially exploded perspective view of a first embodiment of a structure according to the invention;

Fig. 2 is a side view of a detail of Figure 1;

Fig. 3 is a side view of the structure of Fig. 1 in the assembled condition and in a first step of the insertion of the drawer;

Fig. 4 is a view of the structure of Fig. 3 in a subsequent step of the insertion of the drawer;

Fig. 5 is a side view of a second embodiment of a structure according to the invention;

Fig. 6 is a side view of a third embodiment of a structure according to the invention;

Fig. 7 is a sectional view of the structure of support of Fig. 4, taken along a vertical line indicated by VIII-VIII;

Fig. 8 is a side view of a fourth embodiment of the structure according to the invention, in active position;

Fig. 9 is a view of the structure of Fig. 8 in the initial locking position prior to the insertion of the drawer;

Fig. 10 is a view of a telescoping sliding supporting device which uses the sliding structure illustrated in Fig. 8 and 9;

Fig. 11 is a sectional view of Fig. 10, taken along the vertical plane indicated by XI-XI;

Fig. 12 is a view of a detail of the preceding figures;

Fig. 13 is a side view of a roller of a generic structure according to the invention;

Fig. 14 is a diametrical sectional view of the roller illustrated in Fig. 13.

With reference to the above figures, the sliding support structure according to the invention can be applied to each side of a drawer and generally comprises a supporting profiled element 1, a guiding profiled element which can slide inside the supporting profiled element 1, and a linear bearing 3 which is interposed between the fixed profiled element 1 and the movable profiled element 2 to allow their mutual sliding with limited play.

In particular, the profiled element 1 has a generally C-shaped section and can be anchored to the internal wall of a refrigeration compartment, schematically indicated by the broken lines 1', whereas the profiled element 2 has at least partially an L-shaped sectional configuration and can be anchored to a side of a refrigeration drawer schematically illustrated by the broken lines 2'.

The linear sliding bearing 3 is formed by a substantially non-deformable and rigid roller cage 4 provided with supporting rollers 5.

The roller cage is conveniently constituted by a planar vertical core 6 which rigidly connects an upper roller-holder portion 7 to a lower roller-holder portion 8, both of which have a generally prism-like shape and are spaced so as to define a central compartment 4' of the cage. Seats 9 are defined in the upper roller-holder portion 7, which extends for part of the total length of the cage, and corre-

sponding rollers 5 which have a substantially horizontal axis can be inserted in said seats in a snap-together manner. Seats 10 and 11 are defined in the lower roller-holder portion 8, which extends along the entire length of the cage 4, and corresponding rollers 5 with horizontal and vertical axes can be inserted in said seats in a snap-together manner.

Wedge-shaped scraper brushes 12 are provided at the ends of the lower roller-holder portion 8 and have the function of removing any formations of ice or frost located on the lower wing of the supporting profiled element 1.

A controlled stop device, generally indicated by the reference numeral 13, is advantageously provided at at least one of the ends of the rigid cage 4 and allows to lock the bearing 3 with respect to the supporting profiled element 1 when the drawer is completely extracted and to release said bearing when the drawer is at least partially inserted and in a substantially horizontal position.

More particularly, the stop device 13 is constituted by an element 14 which can oscillate elastically in a substantially vertical direction with respect to the cage 8.

In the embodiment illustrated in Figures 1 to 4, the element 14 is an integral part of the vertical core 6 and is connected thereto by means of a pair of thin tabs or blades 15 which form elastic oscillation links which can bend and flex substantially in the vertical plane of the core 6. The number of blades 15 may naturally be larger than two. In general, the larger the number of the flexible tabs or blades 15 and the lower the thickness thereof, the greater the flexibility and freedom of elastic oscillation of the element 14 will be.

Advantageously, according to the invention, an engagement means is defined at the upper end of the element 14 and is constituted for example by a tooth 16 which is directed upward and defines a step or stop seat 17 suitable for interfering with an opposite front surface 18 of the outermost end of the supporting profiled element 1.

A lateral tab or protrusion 19 is provided in the lower part of the element 14 and has such a shape and orientation so as to define a cam for the actuation of the stop device. The protrusion 19 has an upper surface 19' which is suitable for cooperating with the lower surface of the guiding profiled element 2, so as to cause the lowering of the element 14 and the consequent release of the tooth 16 from the abutment surface 18. During its lowering, the lower portion 19" of the tab 19 can partially enter a corresponding cavity 20 defined at the end of the lower roller-holder portion 8, thus allowing the vertical oscillation of the element 14.

It should be noted that the release of the stop element 17 from the front surface 18 occurs only when the guiding profiled element 2 is completely inserted in the compartment 4' of the cage 4 in a completely rested and substantially horizontal position. In case of accidental collision of the front end 40 of the profiled element 2 against the internal walls of the compartment 4', the cage does not deform and cannot pull the stop element 17 downward. Therefore the likelihood of automatic and involuntary release before the drawer is rested horizontally on the cage is extremely low if not nil, differently from the supporting devices of the prior art.

The second embodiment of the structure according to the invention, illustrated in Figure 5, has an element 14' which is defined monolithically from the cage core 6 and is connected thereto by means of a single tab 21 obtained by means of a cut 22.

In the third embodiment, schematically illustrated in Figure 6, the element 14" is separate from, and independent of, the core 6 of the cage 4 and has a lateral tab or actuation cam 23 which is internally hollow so as to accommodate a spring or another similar elastic element 24. Said element tends to keep the stop tooth 16" in raised position; said stop tooth has a seat 17" for abutment against the front and vertical end surface 18 of the supporting profiled element 1.

The element 14' of Figure 5 and the element 14" of Figure 6 obviously act in a manner which is perfectly similar to the element 14 of Figures 1 to 4.

Conveniently, according to the invention, the rollers 5 have a generally cylindrical shape and have slight circular depressions 5' on their lateral walls which are suitable for accommodating complementarily shaped protrusions 5" defined in the lateral walls of the seats 9, 10, 11 of the upper and lower roller-holder portions 7, 8.

A second stop device 13, identical and symmetrical with respect to the first one, is preferably provided at the other end of the cage 4 and is normally kept in retracted position inside the supporting profiled element 1.

As can be seen from Figures 1 to 4, the upper roller-holder portion 7 supports the rollers 5 in an asymmetrical position with respect to the median line M of the cage 6. The horizontal wing 2" of the guiding profiled element 2, and therefore the drawer 2', are thus protrudingly supported in a stable position, with the curved end 40 rested on the innermost roller of the upper roller-holder portion 7 and with the lower surface rested on at least two rollers of the lower roller-holder portion 8.

In order to vary the protruding position of the drawer, so as to stably retain it in an even more external position, it is possible to progressively remove the rollers from the upper roller-holder por-

tion 7 except for one, to allow the curved end 40 of the horizontal wing 2" of the guiding profiled element 2 to be arranged as indicated by the broken lines 40'.

The presence of the second stop device at the other end of the cage allows to reverse the position of the sliding bearings 3 at the sides of each drawer, so that the upper roller-holder portion is in the position indicated by the broken line 7' in Figure 4 and the curved end 40 of the horizontal wing 2" of the guiding profiled element 2 is kept in the innermost position indicated by the broken line 40".

The fourth embodiment, illustrated in Figures 8 and 9, is conceptually similar to the preceding ones, but differs in that the engagement means are constituted by a flexible blade 22' which extends from the upper roller-holder portion 7 and has, at the outermost end, an engagement tab 14"' which has an appropriate shape so that it can be gripped by a user. In the part directed toward the inside of the compartment, the tab 14"' has a recess or internal seat 17"' which is suitable for engaging the front surface 18 of the upper wing of the supporting profiled element 1. The engagement and disengagement of the tab 14"' from the supporting profiled element 1 do not occur automatically, but must be performed manually, and therefore the risk of unwanted sliding of the linear bearing 3 is completely eliminated. As illustrated in Figure 9, the tab 14"', which is initially in engaged position, can be disengaged by means of an outward traction and of a downward release, occupying the positions schematically indicated in broken lines.

In the above described embodiments, the supporting profiled element 1 is fixed directly to the internal compartment of the cabinet, and therefore the maximum stroke of the drawer is determined by the maximum protrusion of the guiding profiled element 2 with respect to the supporting profiled element 1. In order to increase said maximum stroke and/or reduce the length of the profiled elements 1 and 2 it is possible to provide a telescoping structure in which the supporting profiled element 1 can in turn slide within an anchoring profiled element 50.

This situation is schematically illustrated in Figure 10, in which a linear bearing of the type shown in Figures 8 and 9 is used. The supporting profiled element 1 conveniently has an Ω-like shape, with the ends 1', 1" slidably coupled to the upper and lower wings 51, 52 of the anchoring profiled element 50 by means of respective cages 53, 54 which have rollers 55 with a vertical axis and rollers 56 with a horizontal axis.

In all the above described embodiments, the rollers 5 of the cage 3 have, on their lateral walls, slight circular depressions 5' suitable for accommodating complementary protrusions 5" defined in the lateral walls of the seats 9, 10, 11 of the upper and lower roller-holder portions 7, 8, as illustrated schematically in Figures 13 and 14.

A stop block 30 is furthermore provided and can be fixed, by virtue of appropriate anchoring means, to the upper wing 1' of the supporting profiled element 1 proximate to the outermost end, in order to prevent the complete extraction of the cage. Said anchoring means can be constituted for example by a simple lateral longitudinal groove provided with upper and lower internal friction surfaces, respectively indicated by 30' and 30", which can be forced against the upper wing 1" of the supporting profiled element 1.

The rigid cage 4 can be manufactured by injecting into an appropriate mold an acetalic resin or the like, for example of the type produced and marketed by Dupont with the registered trade-mark DELRIN 500, optionally loaded with self-lubricating materials such as molybdenum disulfide.

The rollers may be made of the same synthetic resin which forms the cage or, optionally, for some of said rollers, of metallic material, such as for example stainless steel. The scraper brushes 12 and the stop block 30 may also be made of a thermoplastic synthetic resin. The supporting profiled element 1 and the guiding profiled element 2 are preferably made of metallic materials such as stainless steel or aluminum alloy, optionally coated with protective and self-lubricating layers.

The operation of the device is apparent from what has been described. In use, the cage 4 provided with rollers 5 is inserted in the supporting profiled element 1, on which the stop block 30 is subsequently fixed in such a position that the stop tooth 16 skims the front end surface 18 of the supporting profiled element 1. In the first part of the drawer's stroke, the horizontal wing 2" of the guiding profiled element 2 is inserted in the compartment 4' of the cage between the upper and lower rollers of the linear bearing 3. In the first three described and illustrated embodiments, as the advancement of the drawer continues, the horizontal wing 2" acts on the lateral cam 19, causing it to lower, with the consequent disengagement of the stop tooth 17 from the front end surface 18 of the supporting profiled element 1, thus allowing the advancement of the guiding profiled element 2 with respect to the cage 4 and the advancement of said cage within the supporting profiled element 1.

In the case of the fourth embodiment of the sliding structure according to the invention, the release of the cage occurs only after the manual disengagement of the tab 14"' from the end 18 of the supporting profiled element 1.

Among the advantages provided by the present invention, the fact is observed that the rollers 5 are

substantially free and do not bear on rotation hubs or pivots, so that their friction with respect to the surfaces in contact is a pure rolling friction, without transmitting any tangential stresses at all. Finally, it is noted that the supporting profiled element 1 and the guiding profiled element 2 have no cavities or discontinuities, and that therefore no additional machining, besides their cutting to a selected length and their anchoring by means of appropriate connection elements on the fixed and movable parts of the drawer, is required.

In practice it has been observed that the sliding support structure for drawers according to the invention fully achieves the intended aim, since it allows easy sliding even in the prohibitive environment due to the low operating temperatures of industrial refrigerators, with the assurance of long durability and constant functionality in the absence of corrosion. The structure according to the invention is furthermore easy and simple to manufacture and most of all it is economical, by virtue of the possibility of being manufactured with simple and repetitive operations in large numbers. By means of the use of the specified materials, it has been observed that with rollers having a diameter of 15 mm and a width of 8 mm and with a cage core approximately 1.5 mm thick it is possible to easy bear drawers with a uniformly distributed load of approximately 60 kg.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Sliding support structure for drawers, particularly for industrial refrigerators and the like, which comprises, on each side of a drawer, a fixed supporting profiled element (1) which can be anchored to a refrigeration cabinet (1') and in which at least one guiding profiled element (2) slides and can be fixed to said drawer, at least one linear bearing (3) suitable for allowing the mutual sliding of said profiled elements being inserted between said profiled elements, said bearing (3) being formed by a substantially rigid and non-deformable cage (4) which has an array of rollers (5) and at least one stop device (13) which acts on said supporting profiled element (1) when the drawer is completely extracted and can be released when the drawer is at least partially inserted, characterized in that said stop device (13) comprises a substantially rigid element (14) which can oscillate elastically transversely to the sliding direction and is arranged at one end of said cage (4) which is directed toward the outside of said compartment, said element (14) having engagement means (16, 17) which are suitable for interacting positively and frontally with a front end surface (18) of said fixed supporting profiled element (1).

2. Sliding support structure according to claim 1, characterized in that said element (14) comprises cam means (19) which can be actuated by said guiding profiled element (2) upon its insertion in said supporting profiled element (1) to actuate the vertical oscillation of said element (14), so as to disengage said engagement means (16, 17) from said front end surface (18).

3. Sliding support structure according to claim 2, characterized in that said cam means have an upper surface (19') arranged in such a position as to interact with the lower surface of said guiding profiled element (2) in order to automatically cause the disengagement of said engagement means (16, 17) from said front surface (18) only when said drawer is substantially horizontal.

4. Sliding support structure according to claim 3, characterized in that said cage (4) comprises an upper roller-holder portion (7) which is rigidly connected to a lower roller-holder portion (8) by means of a substantially planar and vertical central core (6).

5. Sliding support structure according to one or more of the preceding claims, characterized in that said oscillating element (14) consists of a movable end portion of said central core (6).

6. Sliding support structure according to one or more of the preceding claims, characterized in that said engagement means consist of an upper tab (16) of said movable end portion (14) of said core, said tab (16) being directed upward, said cam actuation means being constituted by a lower lateral protrusion (19) of said movable end portion (14).

7. Sliding support structure according to one or more of the preceding claims, characterized in that said movable end portion (14') is an integral part of said core (6) and is connected thereto so as to be able to oscillate by means of a flexible tab (21).

8. Sliding support structure according to one or more of the preceding claims, characterized in that said movable end portion (14) is an integral part of said core (6) and is connected thereto by means of a plurality of thin and flexible tabs (15) which form substantially parallel oscillation links.

9. Sliding support structure according to one or more of the preceding claims, characterized in that said stop element (14) comprises elastic means suitable for keeping said oscillating element in a normally raised position.

10. Sliding support structure according to one or more of the preceding claims, characterized in that said elastic means consist of said flexible tabs (15).

11. Sliding support structure according to one or more of the preceding claims, characterized in that said elastic means consist of a spring (24) which is accommodated in a cavity (23) defined in said lower roller-holder portion (8) and suitable for guiding the lower portion of said lateral protrusion (19), said spring acting on said lateral protrusion (19) of said element (14) to keep it in a normally raised position.

12. Sliding support structure according to claim 1, characterized in that said engagement element (14) is constituted by a tab (14''') which can be manually actuated by a user and has a recess (17''') which can engage the front surface (18) of the upper wing (1'') of the supporting profiled element (1).

13. Sliding support structure according to claim 14, characterized in that said tab is connected to the upper roller-holder portion of said cage by means of a flexible blade (22').

14. Sliding support structure according to one or more of the preceding claims, characterized in that it comprises a stroke limit block (30) which is associable with said supporting profiled element (1) to prevent the complete extraction of said cage (4).

15. Sliding support structure according to one or more of the preceding claims, characterized in that said cage (4) is formed monolithically, by injection moulding of plastics.

16. Sliding support structure according to one or more of the preceding claims, characterized in that said array of rollers (5) comprises a plurality of rollers with horizontal axis and a plurality of rollers with vertical axis which can be removably inserted in a snap-together manner within appropriate seats (9, 10, 11) of said upper and lower roller-holder portions (7, 8), each having at least one slight lateral axial depression (5') which forms the positioning seat for complementary protrusions (5'') defined in said upper roller-holder portion (7) and in said lower roller-holder portion (8) in order to keep said rollers in position during the handling of said cage.

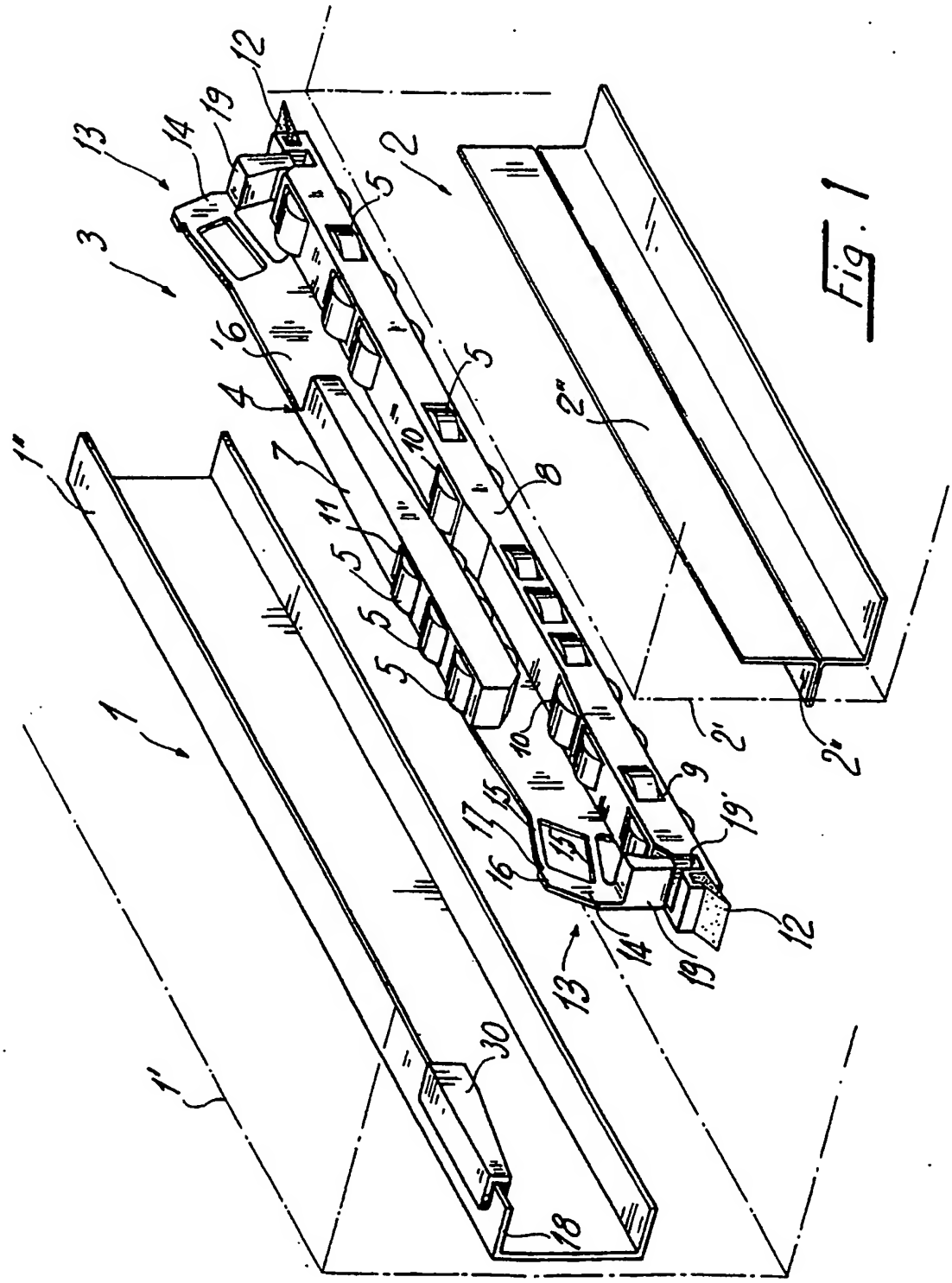

Fig. 1

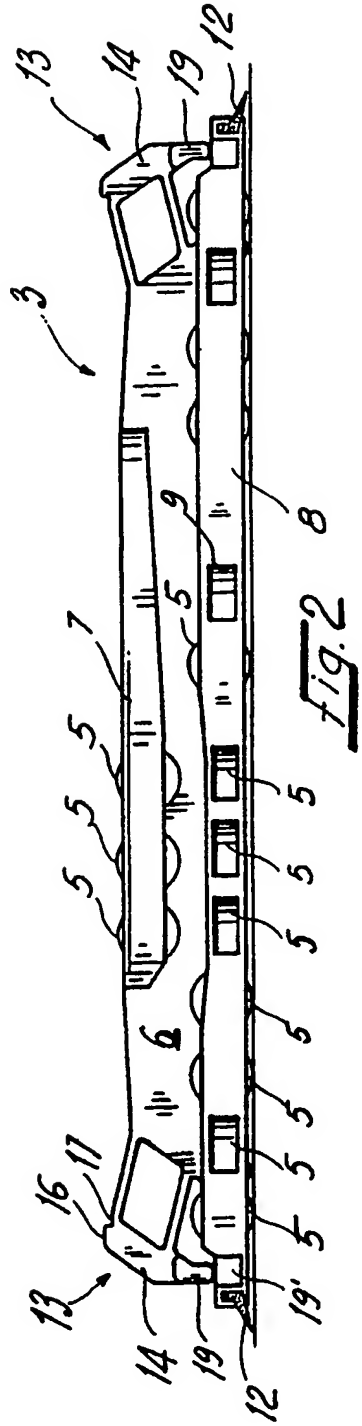

Fig.2

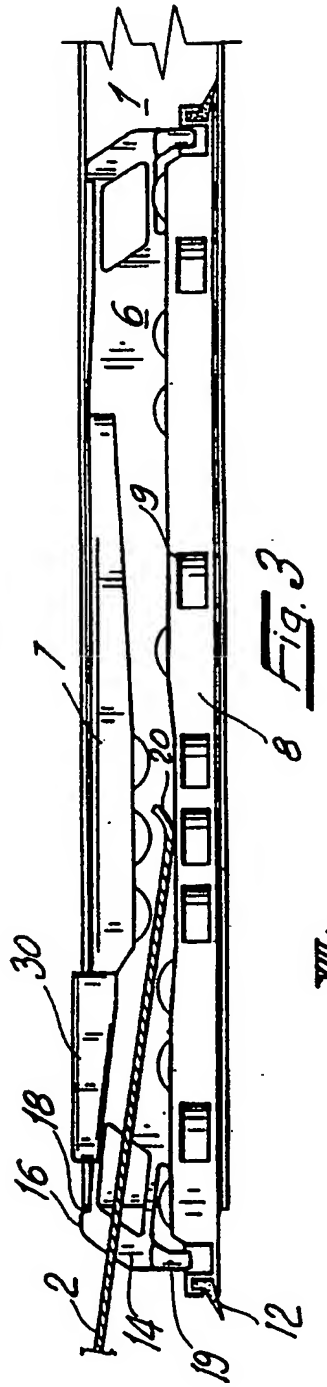

Fig.3

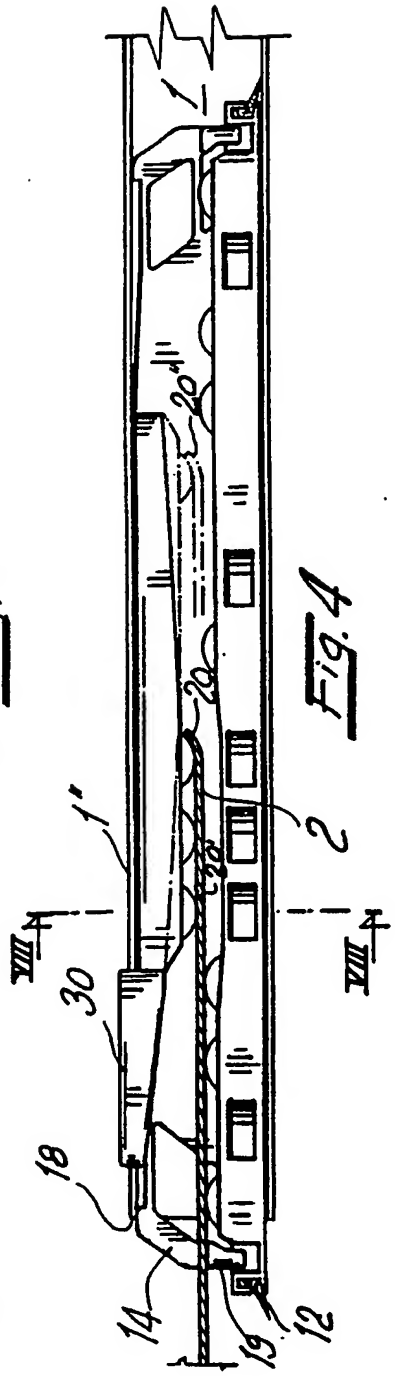

Fig.4

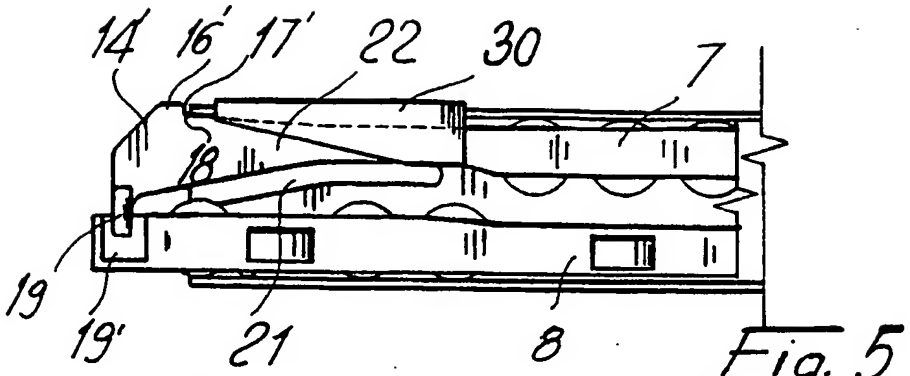

Fig. 5

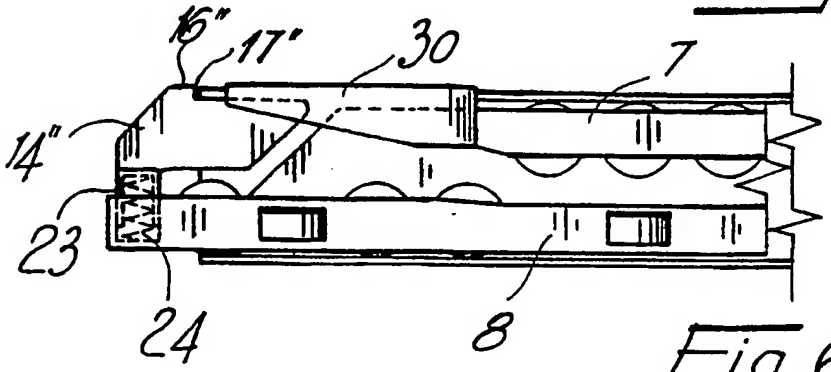

Fig. 6

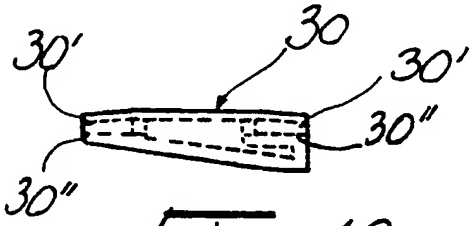

Fig. 12

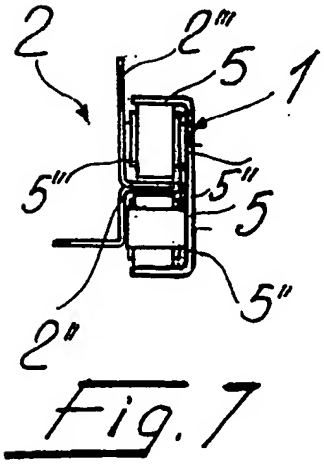

Fig. 7

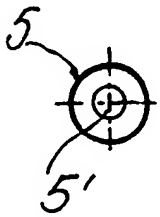

Fig. 13

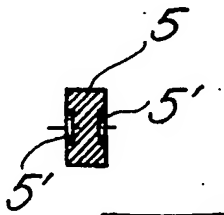

Fig. 14

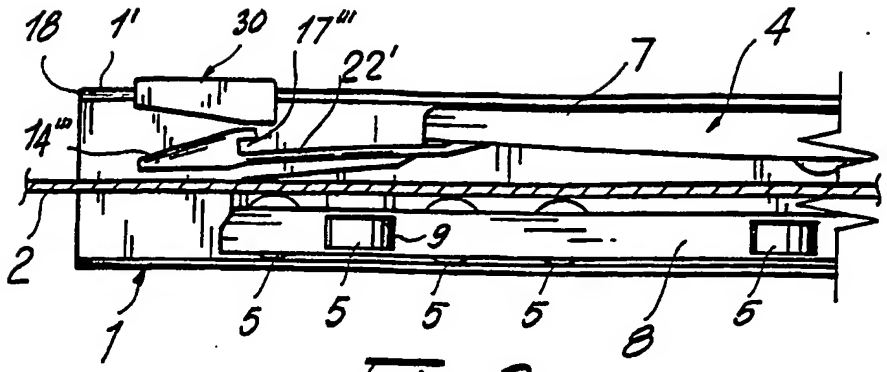

Fig. 8

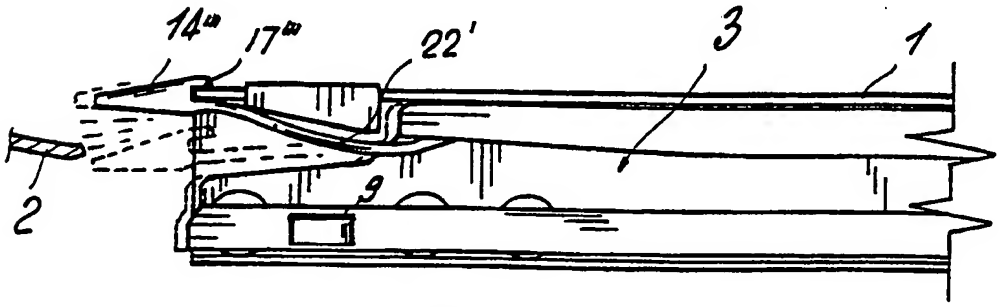

Fig. 9

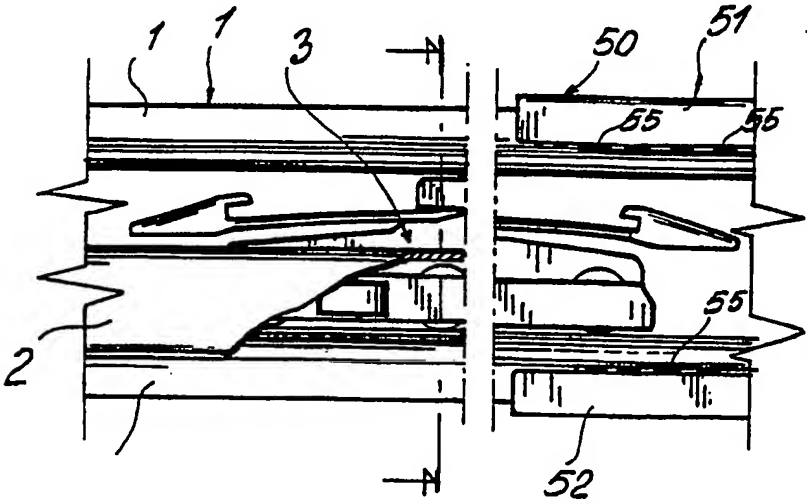

Fig. 10

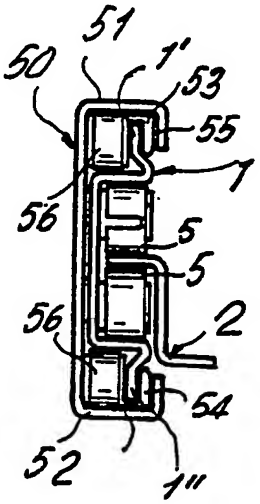

Fig. 11

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 12 4429

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-2 302 444 (JULIUS BLUM GmbH) * Figure 4; pages 1-6 *	1,2,14,15, 16	A 47 B 88/10 F 25 D 25/02
A	GB-A-7 761 23 (GENERAL MOTORS CORP.) * Figures 1-9; page 1, lines 13-34 *	1	
A	FR-A-2 409 028 (JULIUS BLUM GmbH) * Figures 1-6; pages 1-5 *	1,2	
A	DE-A-3 044 884 (PAUL HETTICH & CO.) * Figures 2-4; pages 1-6 *	1,2	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
A 47 B F 25 D

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	12 May 91	NOESEN R.F.

CATEGORY OF CITED DOCUMENTS

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